

CLAIMS

1. A separator for separating multiphase flow, the separator comprising:
an inlet for a multiphase fluid;
5 a plurality of outlets, at least one for each selected separated phase; and
a main annular tubular bore through which the multiphase flow is caused to flow
and to separate into lighter and heavier fluids, the bore having an outlet for each of the
lighter and heavier fluids.
- 10 2. A separator according to claim 1, wherein the inlet is a tangential entry, thereby
causing the fluid to circulate through the main bore.
3. A separator according to either claim 1 or claim 2, wherein the flow area of the
main bore diameter is at least twice the flow area of the inlet bore to allow a stable rotating
15 flow to establish.
4. A separator according to any one of claims 1 to 3, wherein the heavier fluid outlet
is tangential to the main bore, in the direction of the flow and from a lower, outer section
of the main bore.
- 20 5. A separator according to any one of the preceding claims, wherein the lighter fluid
outlet is tangential to the main bore, in the direction of the flow and from an upper, inner
section of the main bore.
- 25 6. A separator according to any one of the preceding claims, further comprising a first
additional tubular bore located below, and in fluid communication with, the heavier fluid
outlet, the first additional bore causing further separation of the flow into lighter and
heavier fluids and having an outlet for each of the lighter and heavier fluids.
- 30 7. A separator according to any one of the preceding claims, further comprising a
second additional tubular bore located above, and tangentially in fluid communication with,
the lighter fluid outlet, the second additional bore causing further separation of the flow
into lighter and heavier fluids and having an outlet for each of the lighter and heavier
fluids.
- 35 8. A separator according to either claim 6 or claim 7, wherein the inlet into the
additional bore is tangential.

9. A separator according to any of one of the preceding claims, further comprising a spiral conduit connected to at least one of the outlets, the conduits(s) having a smaller flow diameter than any of the annular tubular bores, thereby increasing the fluid velocity to enable further separation of the fluids into the desired phases.
10. A separator according to claim 9, wherein the spiral conduit is parallel sided spiral coil having the same coil diameter as the spiral coil above to allow the flow to stabilise.
11. A separator according to claim 9 or claim 10, wherein each conduit defines an envelope, at least part of the envelope being tapered such that the diameters of consecutive loops of the conduit are reduced.
12. A separator according to any one of claims 9 to 11, wherein the bore diameter of the conduit is reduced in the direction of flow therethrough.
13. A separator according to any one of claim 9 to 12, wherein the angle of slope of the pipework in the coil of the spiral relative to the annular bore(s) increases as the fluid flows through the conduit to control the flow relative to the previous section.
14. A separator according to any one of claims 9 to 13, further comprising of one or more outlets from the spiral to allow for the further separation of lighter and heavier fluids.
15. A separator according to any one of claims 9 to 14, further comprising one or more drain and/or vent conduits from each conduit into a tubular bore.
16. A separator according to claim 15, wherein the drain and/or vent conduits exit the conduit(s) tangentially and in the direction of flow to collect the required phase.
17. A separator according to any one of the preceding claims, further comprising an outlet for solid slurry.
18. A separator according to any one of the preceding claims, wherein the annular tubular bore(s) is(are) circular.